

# **IQRPE Design Assessment Report for IDF Leachate Tank Domes**

Prepared for the U.S. Department of Energy  
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy  
under Contract 89303320DEM000030



**P.O. Box 1464  
Richland, Washington 99352**

# IQRPE Design Assessment Report for IDF Leachate Tank Domes

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Central Plateau Cleanup Company LLC (CPCC)

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**APPROVED**

*By Lynn M Ayers at 3:21 pm, Nov 04, 2021*

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Release Approval

Date

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**Independent Qualified Registered Professional Engineer  
Design Assessment Report  
For  
Integrated Disposal Facility (IDF) Leachate Tank Domes**

**IQRPE Design Assessment Report  
No. DA-332610-02  
Rev. 2**

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For:



Meier Project No. 20-8692  
DGR Construction Contract No. 332610  
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October 21, 2021

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## LIST OF TERMS

### Acronyms and Abbreviations

AA	Aluminum Association
ACI	American Concrete Institute
Al	Aluminum
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
CHPRC	CH2MHILL Plateau Remediation Company
CPCCo	Central Plateau Cleanup Company
Cu	Copper
DGR	DGR Grant Construction, Inc.
ECR	Engineering Change Request
EDT	Engineering Data Transmittal

HSS	hollow structural section
IBC	International Building Code
IDF	Integrated Disposal Facility
ILAW	Immobilized Low-Activity Waste
IQII	Independent Qualified Installation Inspector
IQRPE	Independent Qualified Registered Professional Engineer
LCRS	Leachate Collection and Removal System
LLW	Low-Level Waste
max.	maximum
Meier	Meier Architecture • Engineering
Mg	magnesium
Mn	Manganese
min	minimum
MLL	Mixed Low-Level waste
Si	Silicon
SOW	Statement of Work
SS	stainless steel
WAC	Washington Administrative Code
WTP	Waste Treatment and Immobilization Plant

## Units

'	feet/foot
%	percent
”	inch/inches
C	Celsius
dia.	diameter
ft	feet/foot
h, hr	hour
kip	kilo pound
km/h	kilometer per hour
m	mil
m/s	meters per second
mm	millimeter
mph	miles per hour
N	Newton
kN	kilonewton
Nm	Newton meter
plf	pounds per lineal foot
psf	pounds per square foot
psi	pounds per square inch
s, sec	second

## 1.0 INTRODUCTION

The Washington Administrative Code (WAC) 173-303, *Dangerous Waste Regulations*, provides a set of requirements for Owner/Operators of dangerous waste tank systems. This Design Assessment Report is prepared for DGR Grant Construction (DGR) for Central Plateau Cleanup Company (CPCCo) by an Independent Qualified Registered Professional Engineer (IQRPE) to certify that the proposed tank system will have sufficient structural integrity and is acceptable for storing and treating dangerous waste per WAC 173-303-640(3), *Design and Installation of New Tank Systems or Components*. The scope of this task involves the addition of new tank domes to cover the existing Integrated Disposal Facility (IDF) Leachate Tanks. Due to a change of Hanford prime contracts, CPCCo has taken over the duties of CHPRC.

IP-332610-01, *IQRPE Inspection Plan for Integrated Disposal Facility (IDF) Infrastructure Upgrades*, identifies the IQRPE inspections required for procurement, fabrication, testing, and installation of the Tank Dome Covers associated with the IDF Infrastructure Upgrades Project.

IA-332610-02, *IQRPE Installation Assessment Report for Integrated Disposal Facility (IDF) Leachate Tank Dome Covers* will be prepared for DGR by an IQRPE to certify that the tank system installations are in accordance with WAC 173-303-640(3)(c)-(g).

The IQRPE maintains “independence” at all times. However, comments by others are considered by the IQRPE during the preparation of reports and plans. Only the IQRPE can implement changes to the master IQRPE documents.

## 1.1 PROJECT DESCRIPTION

### 1.1.1 Background

The scope of this work is to prepare the IDF for the disposal of Immobilized Low-Activity Waste (ILAW) from the Waste Treatment Plant (WTP). Additionally, the IDF will receive Low-Level Waste (LLW) and Mixed Low-Level (MLL) waste from various Hanford site operations.

The new leachate tank covers are included as part of a tank system under WAC 173-303-640(3). For new tank systems and components, an integrity assessment must be performed to conform to the requirements found in WAC-173-303-640(3) certified by an IQRPE in accordance with WAC-173-303-810(13)(a), *Certification*.

The leachate tanks currently have floating covers. These are difficult to maintain due to the water and debris which collects on the top of them and needs to be periodically removed. New tank dome covers will allow debris and participation to slide off the dome without entering the leachate tanks.

This activity constitutes a design modification to an existing facility. In accordance with WAC-173-303-640(3)(a), modification of an existing facility requires that the IQRPE attest that the modifications will not impact the structural integrity of the component and is acceptable for handling dangerous waste.

### 1.1.2 IQRPE Scope

Meier Architecture • Engineering (Meier) is the IQRPE of record for the IQRPE Support for the IDF Leachate Tank Dome Covers Project. Meier will provide IQRPEs and Independent Qualified



Installation Inspectors (IQIIs) to review the design, fabrication, and installation activities involving the IDF Leachate Tank Dome Covers per Statement of Work (SOW) for Construction Requisition No. 00332610, *IDF Infrastructure Upgrades – Leachate Tank Domes*.

A review of design documents (drawings, calculations, specifications, Engineering Change Requests [ECR], etc.) was completed by the IQRPE. Included within the scope of the IQRPE review are various technical evaluations covering the structural design of the leachate tank domes and the structural design of the foundation system supporting those domes.

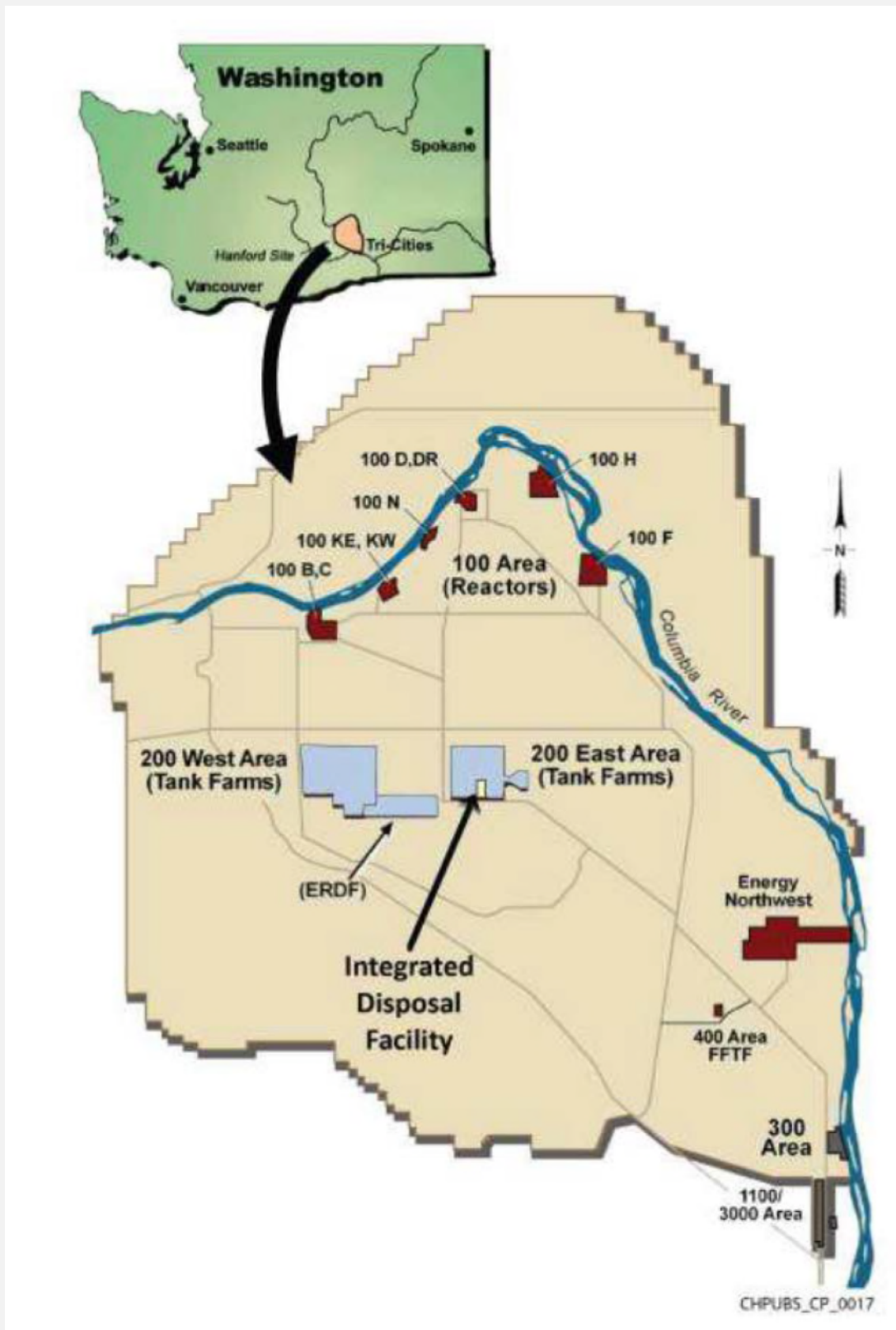
The IQRPE performed the design assessment to the requirements of WAC 173-303-640(3). The scope of the IQRPE assessment will include the evaluation of the new leachate tank domes, their structural support foundations, and lateral bracing for IDF Leachate Tanks 219A201 and 219E201 in accordance with design information included in:

- H-2-837964, *IDF Infrastructure Site Plan*.
- H-2-837972, *IDF Infrastructure Structural Notes and Legend*.
- H-2-837973, *IDF Infrastructure Tank Cover Foundation Plan*.
- CHPRC-04065, *Tank Cover Support Framing and Foundation Calculations*.
- RPS Engineering Incorporated Drawing No. 602899-20-00, *IDF-1 and IDF-2*.
- E040, Sheets 1 and 2, 2021, *Geo-Dome Column Modification*.

The leachate tanks were constructed in accordance with RPP-18489, *Integrated Disposal Facility (IDF) Detailed Design: Technical Specifications Final Design Submittal*. This IQRPE design assessment takes credit for previously issued IQRPE Integrity Assessment Reports for the existing IDF Leachate Tank Systems detailed in RPP-RPT-25837, *IQRPE Design Assessment Report, Cell 1*, and RPP-RPT-27414, *IQRPE Design Assessment Report, Cell 2*.

The IDF Leachate Tank Dome Covers are located at the IDF on the Hanford Nuclear Waste Site in the 200 East Area.

The following figures show the general layout of the project location, infrastructure, and other pertinent details.

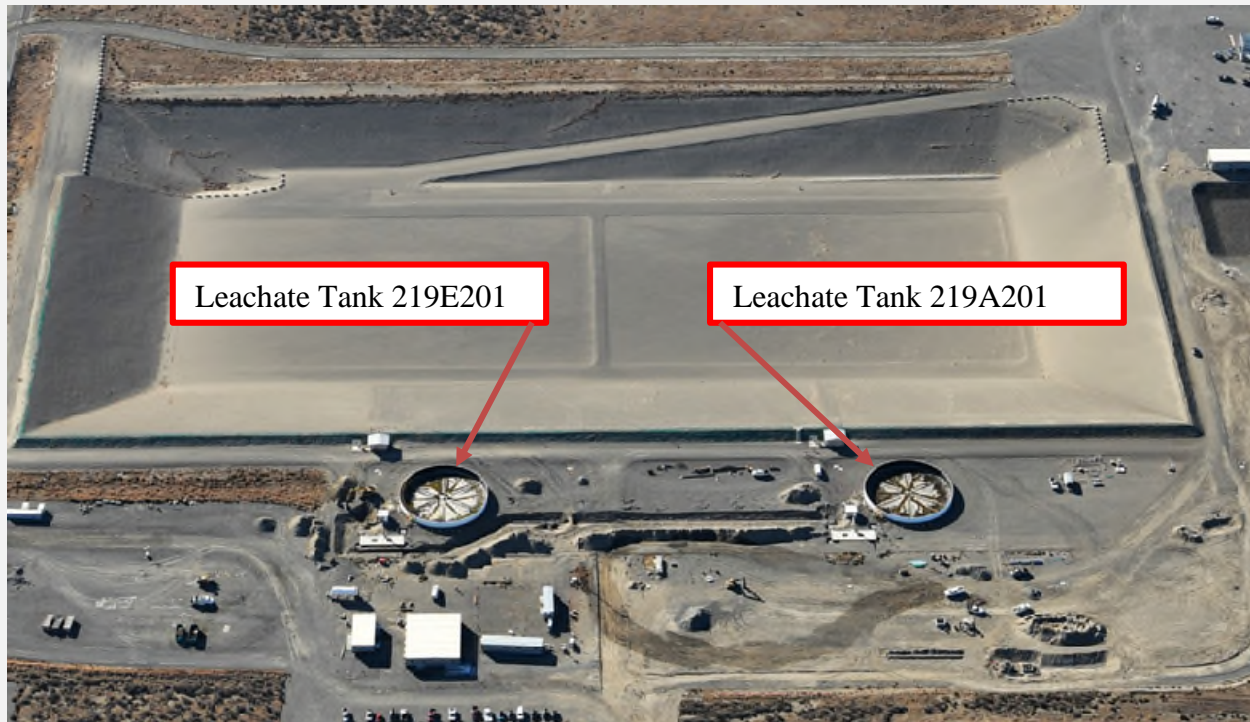


**Figure 1: Location of the Integrated Disposal Facility on the Hanford Site (CHPRC-03789)**

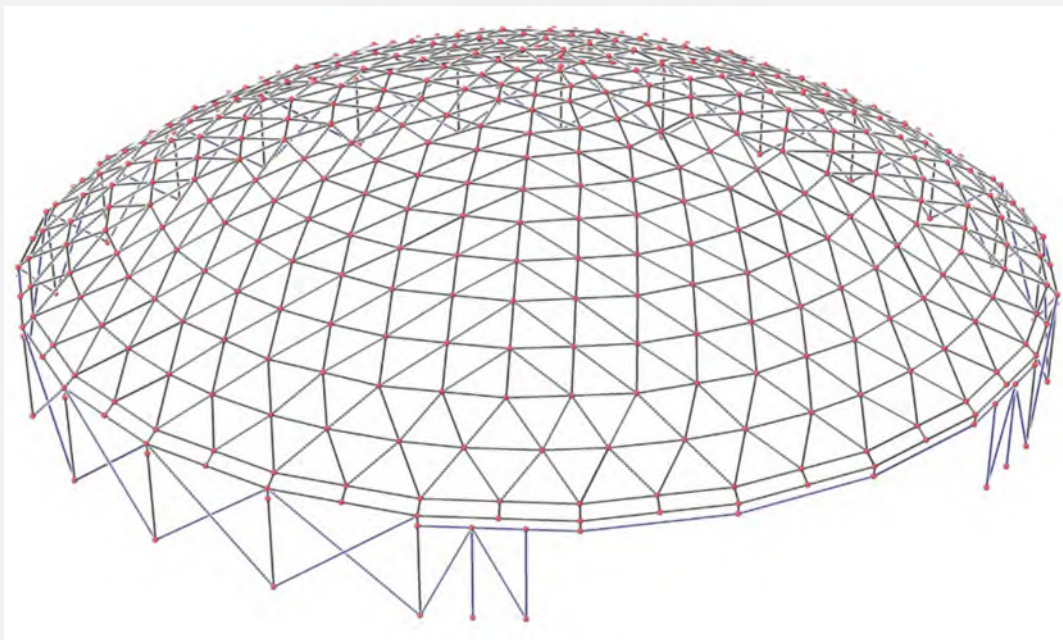


**Figure 2: Early Aerial View of the Integrated Disposal Facility (CHPRC-03789)**

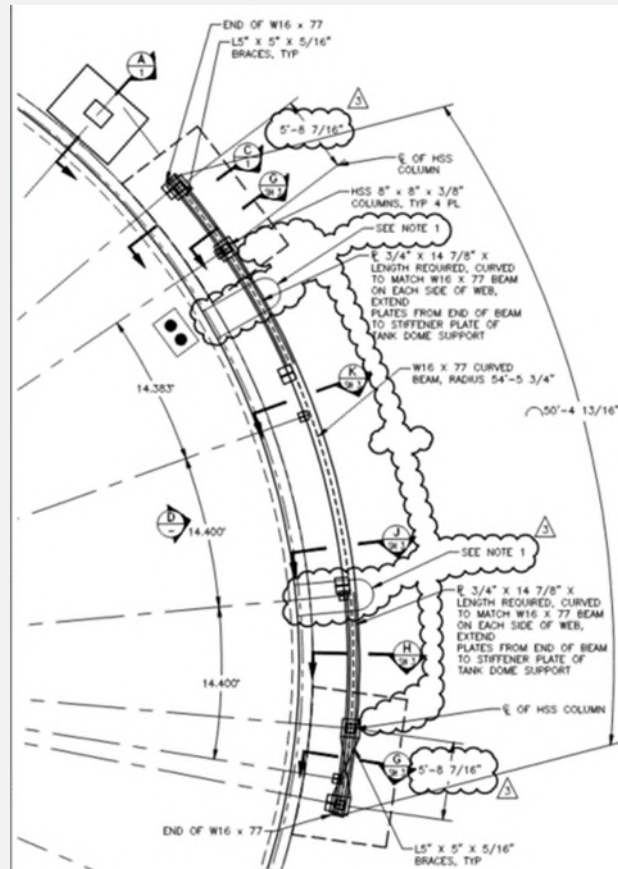




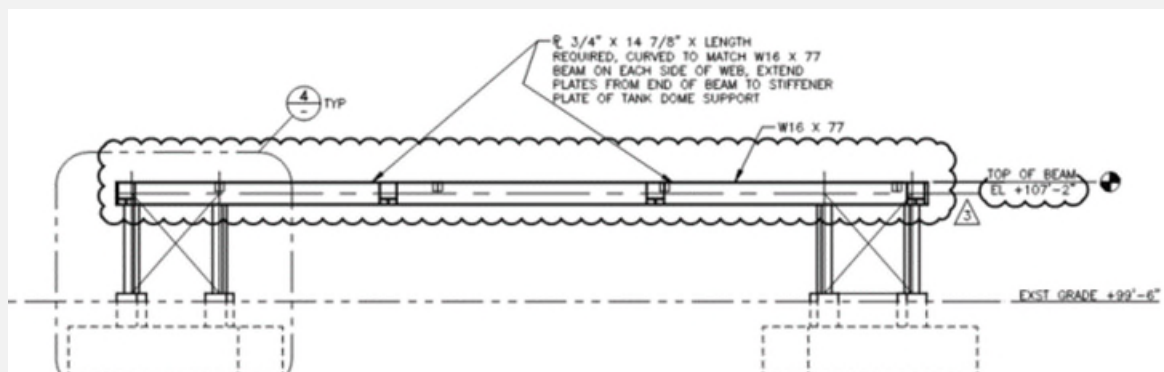
**Figure 3: Current Aerial View of the Integrated Disposal Facility (Washington River Protection Solutions, LLC, Issue 553, Dec. 1, 2020)**



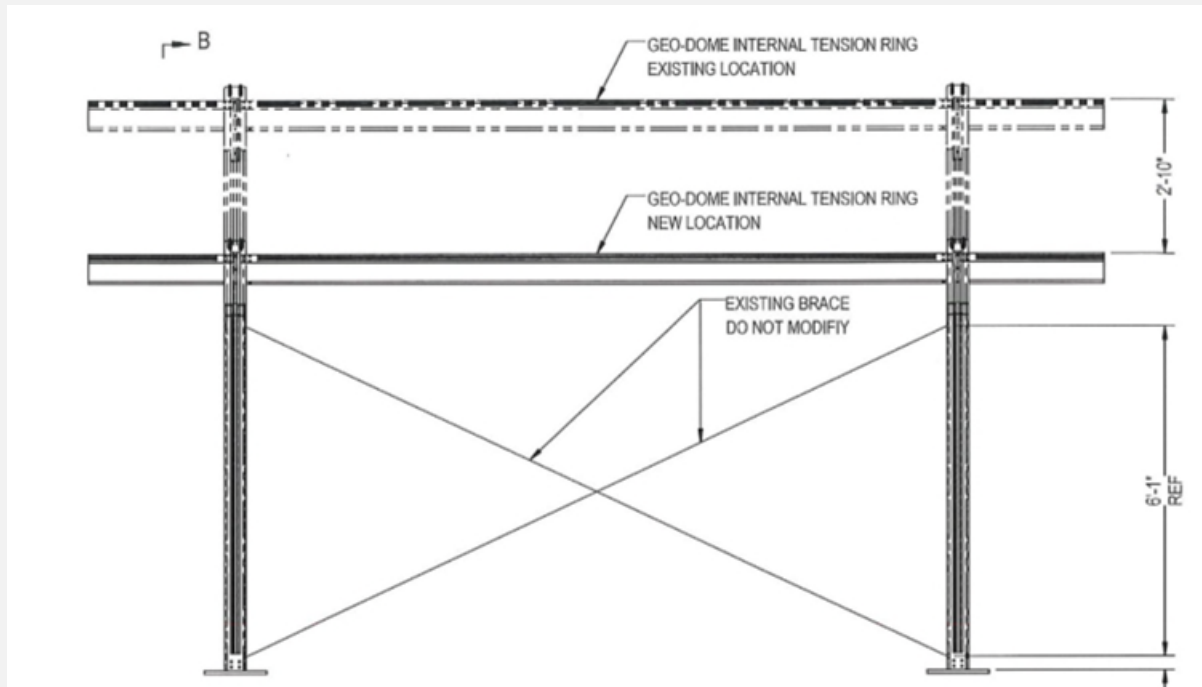
**Figure 4: Overall Aluminum IDF Leachate Tank Dome Cover Structure (CHRPC-04065, Page 251)**



**Figure 5: Braced Frame Plan (H-2-837973, Sheet 2)**



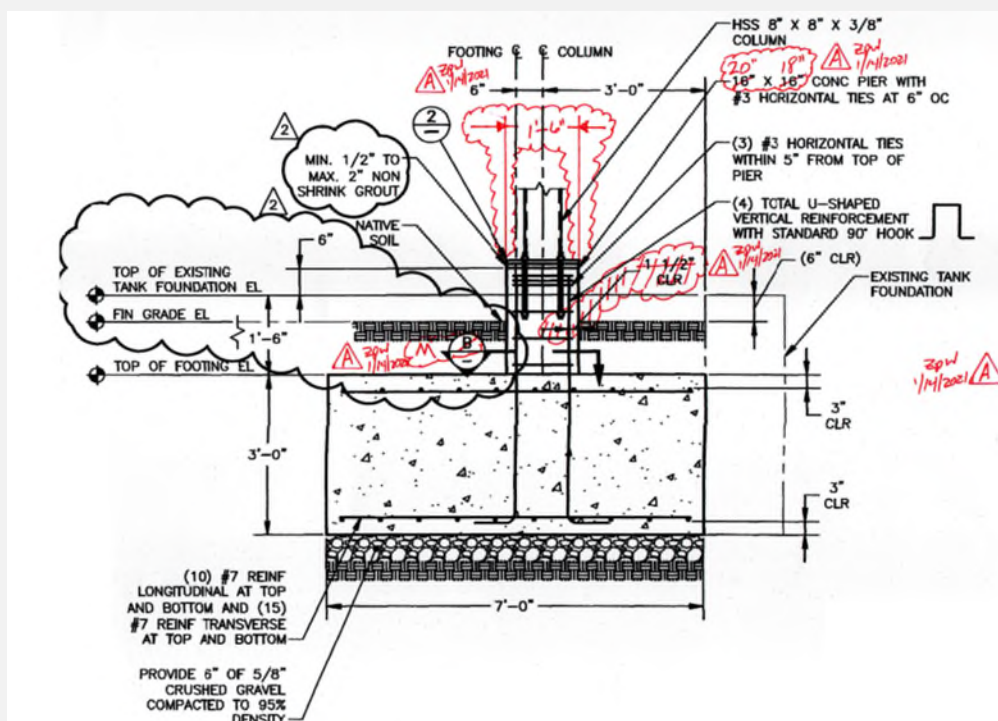
**Figure 6: Braced Frame Elevation (H-2-837973, Sheet 2)**



**Figure 7: Geo-Dome Column Modification (E040, Sheet 2)**







**Figure 9: IDF Leachate Tank Cover Post Foundation (H-2-837973, Sheet 1)**

## 1.2 DESIGN REVIEW REQUIREMENTS

Many of the components required for the transfer of dangerous or mixed waste are regulated by WAC 173-303-640(3) requirements. WAC codes require an IQRPE's review of the design of these components prior to installation.

As a basis for the IQRPE certification, a review is performed on a final version of the document design package as prepared and reviewed by CPCCo. Documents such as drawings, calculations, ECRs, Engineering Design Transmittals (EDTs), Technical Evaluations, and specifications included in the design review package that are marked as final, and have signatures of the preparer, checker, and approver are reviewed by the IQRPE as a completed document. All other documents will be reviewed as preliminary or supportive information.

The IQRPE maintains "independence" at all times. Comments by others are considered by the IQRPE during the preparation of reports and plans. Only the IQRPE can implement changes to the master IQRPE documents.

## 1.3 DESIGN OVERVIEW FOR LEACHATE TANK DOME COVERS

This IQRPE Design Assessment Report is prepared for DGR and CPCCo by an IQRPE to certify that the proposed tank system will have sufficient structural integrity and is acceptable for storing and treating dangerous waste per WAC 173-303-640(3)(a).

The components within the scope of this IQRPE design assessment for the IDF Leachate Tank Dome Covers Project includes only those that either will be, or have the potential to be, in direct



contact with waste fluids and those components that are being relied upon to provide protection to other components that do contain waste.

## **1.4 SCOPE OF IQRPE DESIGN ASSESSMENT**

This IQRPE design assessment includes a comprehensive review of the design package per WAC 173-303-640(3).

### **1.4.1 Portions of the IDF Leachate Tank Dome Covers Included in Scope for IQRPE Certification**

Documents included in this design review for the IDF Leachate Tank Dome Covers Project include:

- Procurement Information
- Construction Specifications
- Technical Specifications
- Design and Fabrication Drawings
- Structural Calculations

A list of documents reviewed by the IQRPE as part of this Design Assessment Report is included in Section 4.0.

### **1.4.2 Portions of the IDF Leachate Tank Dome Covers Included in Scope for IQRPE Certification**

This IQRPE design assessment was limited only to IDF Leachate Transfer Dome Cover components that either will be, or have the potential to be, in contact with waste. Components that are not within the scope of this IQRPE design assessment include those that will not be in direct contact with waste fluids, with the exception of those components that are being relied upon to provide protection to other components that do contain waste.

## **2.0 ASSESSMENT SUMMARY**

The IDF Leachate Tank Dome Covers are adequately designed to prevent failure caused by corrosion or by structural loads imposed by the system's intended service. These conditions are described in more detail below. The system design complies with the applicable requirements of WAC 173-303-640(3). Design documents that were reviewed as part of this assessment are referenced in Section 4.0.

## **2.1 CODES, STANDARDS, AND REGULATIONS**

The codes, standards, and regulations specifically used during the preparation of this certification are referenced, as necessary, throughout this report. A complete list of applicable references is contained in Section 4.0.

## 2.2 BASIS OF DESIGN

The design details associated with IDF Leachate Tank Dome Covers Project components are presented in subsequent sections.

Criteria utilized in the design of the IDF Leachate Tank Dome Covers originated from:

- ACI 318-14, *Building Code Requirements for Structural Concrete*.
- API 650, *Welded Steel Tanks for Oil Storage*.
- ASCE 7-10, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*.
- CHPRC-03789, *Functional Design Criteria: Integrated Disposal Facility Infrastructure*.
- CPCC-PRO-EN-097, *Engineering Design and Evaluation (Natural Phenomena Hazard)*.
- IBC-2015, *International Building Code 2015*.

### 2.2.1 Structural Design Standards

WAC 173-303-640(3) requires that an IQRPE certify that the proposed tank system will have sufficient structural integrity and is acceptable for storing and treating dangerous waste. This assessment must show, in accordance with WAC 173-303-640(3) that the foundation, structural support, seams, connections, and pressure controls are adequately designed and that the tank system has sufficient structural strength, compatibility with the waste to be stored and treated, and corrosion protection to ensure that it will not collapse, rupture, or fail. The IDF Leachate Tank Domes are constructed in accordance with CHPRC-03953, *Integrated Disposal Facility (IDF) Infrastructure Construction Specification*.

The IDF Leachate Tank Domes are geodesic domes that are supported on columns and foundations that are independent of the Leachate Tanks. The domes will not be in contact with soil.

CHPRC-04065 evaluates the dome structure and the supporting foundations to ensure that it will withstand all relevant loading conditions when installed.

#### 2.2.1.1 Dome Structure

Dome materials provided by the dome vendor are listed in Table 1. Braced Frame Materials provided by the general contractor are shown in Section 2.2.1.2.1. Foundation Materials are listed in Section 2.2.1.3.2.

##### 2.2.1.1.1 Dome Materials

**Table 1: Dome Materials (CHPRC-04065, Page 247)**

Building Materials	
Dome Diameter = 32.920 m	
Aluminum	Aluminum space frame H-Profiles (applies to all clear span structural members): AlMgSi 0.7 F26 (=0.70% Mg) [6005A]

(No aluminum alloy with a magnesium content greater than 3% shall be used since design temperature is 85 degrees C. Alloy 6005A for extrusions as well as Alloy 6082 are recognized with properties established by Aluminum Association (AA). See also AA Teal Sheets 2009 released by Aluminum Association February 2009, latest edition)	Aluminum Box-Profiles (applies to cantilevers and Internal Tension (slide support mode only): AlMgSi 1.0 F27 (=1.00% Mg) [6082]
	Aluminum gusset plate: AlMgSi 1 F32 [6082] thickness = 10.000mm
	Triangular aluminum sheets: AlMnCu (3003) thickness = 1.200mm
Screws	Stainless Steel Bolts 10mm and 16mm 1.4301 (SS304)
Structural Steel	A36 Weld grooves min. 5mm

### 2.2.1.1.2 Dome Design Parameters

The structural dome design parameters are given in Table 2. The CPCCo minimum required dome parameters are also listed. The vendor of the dome determined that the seismic forces are considerably smaller than the wind forces. Therefore, seismic forces are not included in the 3-dimensional dome analysis. (CHPRC-04065, Pages 8, 247 and 332).

**Table 2: Dome Design Parameters (CHPRC-04065, Pages 8, 247 and 332)**

Parameter	Final Design Parameter	CPCCo Required Minimum Design Parameter
Diameter	32.92 m	32.9 m (107.94 ft)
No of Supports	25	25
Weight	223.71 kN (50.29 kip)	Self weight
Uniform Dead Line Load	0.025 kN/m (1.71 plf)	Self weight
Uniform Live Load	1.0 kN/m <sup>2</sup> (20.9 psf) min	20 psf
Uniform Snow Load	18 psf	18 psf
Wind Speed	193 km/h (120 mph)	110 mph
Ash Load	Does not control load combinations by observation	3.2 psf
Seismic Load	Does not control load combinations by observation	Does not control load combinations by observation

### 2.2.1.1.3 Dome Utilization Ratios

Results of the design analysis indicate that the maximum connection utilization of dome occurs in bar group 4 and is 92.196% (CHPRC-04065, Page 333). This utilization ratio is for the loading utilized in the dome design. Actual utilization ratios are less because the loading utilized for wind was 120 mph and only 110 mph was required as noted in Table 2.

### 2.2.1.2 Dome Cover Braced Frame Support

The dome cover braced frame support as shown in Figure 5 and Figure 6 was designed in CHPRC-04065 utilizing the reactions provided by the Aluminum Dome Cover Vendor. This braced frame serves two (2) purposes. The first is to allow a larger section of tank wall access without interior columns. The other is to prevent torsional rotation of the dome cover. In calculation CHPRC-04065, the reactions due to wind on the dome cover were adjusted to the required 110 mph wind speed instead of designing the support structure for the 120 mph wind speed utilized in the Aluminum Dome Cover Vendor calculations.

In addition to the structural steel braced frame support designed in CHPRC-04065, the dome cover has bracing between the legs provided by the dome vendor as shown in Figure 7.

#### 2.2.1.2.1 Dome Cover Braced Frame Support Materials

The materials utilized for the braced frame support were ASTM A992 for the curved wide flange beam, ASTM A500 Grade B for the hollow structural section (HSS) square members, and ASTM A36 for all channels, angles, plates, and bars (H-2-837972 and CHPRC-04065).

#### 2.2.1.2.1 Dome Cover Braced Frame Support Utilization Ratios

**Table 3: Dome Cover Braced Frame Design Parameters (CHPRC-04065, Page 12)**

Braced Frame Support Member	Size	Maximum Flexural Utilization Ratio	Maximum Shear Utilization Ratio
Curved Beam	W16x77	0.641	0.172
Column	HSS8x8x3/8	0.171	0.006
Braces	L5x5x5/16	0.061	0.013
Knee Brace Connection	3/8" Gusset Plate	0.12	NA
Base Plate Gusset Plate Connection	3/8" Gusset Plate	0.65	NA

### 2.2.1.3 Dome Foundation

#### 2.2.1.3.1 Design Loads

The design loads are as stated in Section 2.2.1.1.2, Dome Design Parameters. The design allowable soil bearing pressure is 3,800 psf (RPP-18486, Appendix C.11.a, *Analytical Calculations, Foundation Analyses*, and CHPRC-04065, Page 7).

#### 2.2.1.3.2 Foundation Materials

Dome foundation materials are listed in Table 4.

**Table 4: Dome Foundation Materials (H-2-837972, Sheet 1)**

Concrete						
Mix Design Requirements	Specified 8-Day Compressive Strength	Maximum Aggregate Size	Max W/C Ratio	Air Content (%)	Max Fly Ash Content (%)	Max Slump (inches)
Footings	3000 psi	1"	0.5	3.0	15.0	8
Foundation Walls	3500 psi	¾"	0.5	5.0	15.0	8
Steel						
Reinforcement	Reinforcing bars shall be grade 60.					
Anchor rods	All cast in place anchor rods shall be headed or hooked and shall be per ASTM F1554, Grade 36 unless noted otherwise on plan drawings.					

### 2.2.1.3.3 Foundation Design

Per the design documents, the dome cover to be installed over the tank is supported at the foundation by pad footings and combined footings. The combined footings are 36" thick and the bottom of the new footing is to match the bottom of the existing ring foundation (H-2-837973, Sheet 1). Provided the tanks are empty at the time of placement of the new footings, and adequate re-compaction takes place, this should not pose any issues.

Table 5 lists the design utilization ratios for the foundation elements.

### 2.2.1.3.4 Dome Cover Foundation Member Utilization Ratios

**Table 5: Dome Design Parameters (CHPRC-04065, Page 12)**

Tank Dome Cover Foundation Member	Dimensions	Max. Flexural Utilization Ratio	Max. Shear Utilization Ratio	Bearing Pressure Ratio
Pad Footings Under Typical Support	4'-6"x6'-0"x12" with (6) #5 each way at bottom	0.308	0.223	0.299
Base Plate and Anchorage for Pad Footing	Plate Supplied by Vendor with (6) 1/2" dia. x 13" F-1554 heavy hex-head bolts	0.620	0.124	0.620 Combined tension and shear
Combined Footings Under Columns	7'-0"x11'-0"x36" with (10) #7 longitudinal and (15) #7 transverse	0.049	0.086	0.569

Base Plate and Anchorage for Combined Footing	3/4"x14"x1'-2" plate with (4) 1" dia. x 13" F-1554 heavy hex-head bolts	0.65	N/A	N/A
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#### **2.2.1.4 Structural Design Exceptions**

Based on the above information, there are no IQRPE certification exceptions to the structural design standards review of the IDF Leachate Tank Domes Project.

#### **2.2.1.5 Structural Design Conclusion**

The IQRPE concurs that this design basis meets the requirements of WAC 173-303-640(3)(a).

### **2.2.2 Waste Compatibility**

Regulations located in WAC 173-303-640(3)(a) require tank systems be compatible with the wastes stored. The leachate tank dome covers are not in direct contact with the liquid waste. The only waste that would be in contact with the new aluminum dome covers would be incidental vapors originating from the stored waste, which is not considered a concern.

#### **2.2.2.1 Waste Compatibility Design Exceptions**

Based on the above information, there are no IQRPE certification exceptions to the waste compatibility design standards review of the IDF Leachate Tank Domes Project.

#### **2.2.2.2 Waste Compatibility Design Conclusion**

The IQRPE concurs that this design basis meets the requirements of WAC 173-303-640(3)(a).

### **2.2.3 Pressure Control System**

WAC 173-303-640(3)(a) requires that an IQRPE certify that the proposed tank system has been designed with appropriate pressure control systems. The components of the IDF Leachate Dome Covers were evaluated for pressure control issues. See Table 6 for summary of venting.

**Table 6: IDF Leachate Tank Dome Venting (API Standard 2000, CHPRC-04065, Page 249)**

Emergency Vents Compliance per API 2000						
1. Mandatory Venting Capacity:	diameter	used height	wetted area		emergency venting capacity	
	[m]	[m]	[m <sup>2</sup> ]		Nm <sup>3</sup> /sec	Nm <sup>3</sup> /hr
DOMES	32.92	9.14	945.65		15.69	57,466.33
2. Realized Venting Capacity	Net Rim gap:	Pressure Drop	Exhaust velocity	Net section area		
	[mm]	[kN/m <sup>2</sup> ]	[m/s]	[m <sup>2</sup> ]	Nm <sup>3</sup> /sec	Nm <sup>3</sup> /sec
	30	0.08	11.31	3.1	35.12	126,419.3
3. Utilization Ratio						45.46%

**2.2.3.1 Pressure Control Design Exceptions**

Based on the above information, there are no IQRPE certification exceptions to the pressure control design standards review of the IDF Leachate Tank Domes Project.

**2.2.3.2 Pressure Control Design Conclusion**

The IQRPE concurs that this design basis meets the requirements of WAC 173-303-640(3)(a).

**2.2.4 Corrosion Assessment**

WAC 173-303-640(3) requires an IQRPE corrosion assessment of only the external portion of the primary containment that is in direct contact with soil or water. The tank dome is not part of the primary containment, so this assessment is not relevant.

**2.2.4.1 Corrosion Design Exceptions**

Based on the above information, there are no IQRPE certification exceptions to the corrosion design standards review of the IDF Leachate Tank Domes Project.

**2.2.4.2 Corrosion Design Conclusion**

The IQRPE concurs that this design basis meets the requirements of WAC 173-303-640(3)(a).

**2.2.5 Recommended Inspection Schedule**

Inspections completed for the installation will be described in IA-332610-02. Per the requirements of WAC 173-303-640(3)(c), the Installation Assessment Report will provide Inspection Reports documenting installation and any modifications applicable to this design assessment.

Per the requirements of WAC 173-303-640(2)(e), *Assessment of Existing Tank System's Integrity*, “a schedule for conducting integrity assessments over the life of the tank to ensure that the tank retains its structural integrity and will not collapse, rupture, or fail. The schedule must be based on the results of past integrity assessments, age of the tank system, materials of construction, characteristics of the waste, and any other relevant factors.”

The new equipment installed under this document for the IDF Leachate Tank Dome Covers Project includes:

- IDF aluminum leachate tank dome cover including columns and bracing.
- Braced frame.
- New foundations to support tank dome cover.

The IDF design life is anticipated to be 40 years, based on the operation of the WTP and receipt of ILAW. The site infrastructure and support facilities are expected to remain in use throughout the 40-year design life. The Leachate Collection and Recovery System (LCRS) is expected to remain in use up to an additional 30 years beyond the 40-year design life to allow for post-closure monitoring (CHPRC-03789).

Because these items are new, no prior integrity assessments have been completed. Since these items are expected to be installed in 2021, or later, the age of these elements is new. To allow time for an integrity assessment, it is recommended that a complete Integrity Assessment Report be completed of the above tank system elements within 15 years after initial installation. It is anticipated these new elements of the tank system will be evaluated as part of the entire system and will be included in the overall IQRPE Integrity Assessment Report for this system in accordance with the interval for integrity assessment established by the operator for the system, as long as the scheduled integrity assessment falls within the recommended period provided here.

### **3.0 DESIGN REVIEW ASSESSMENT CERTIFICATIONS**

The IDF Leachate Tank Dome Covers Project, as previously described, has been reviewed by the IQRPE and was assessed to be in compliance with the applicable sections of WAC 173-303-640(3). These results are based on a review of the applicable codes, standards, and documents.

A listing of the IQRPE, Professional Engineers, and other engineers who participated in the preparation of this Design Assessment Report is provided below.

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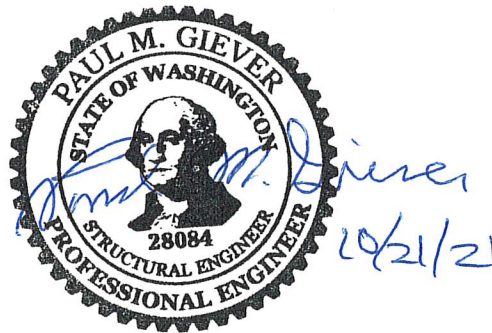
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The certification below is in accordance with the requirements of WAC 173-303-810(13)(a).

**Report Lead IQRPE:**

WAC 173-303-810(13)(a)

*I certify under penalty of the law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*



Report Reviewed by:

Paul M. Giever

Paul M. Giever, P.E.

Independent Qualified Registered Professional Engineer

October 21, 2021  
Date

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WAC 173-303-810(13)(a), “*Certification*,” Washington Administrative Code, as amended.